

CLAIMS:

1. A power plant predominantly for houses or industrial buildings, comprising

(a) a reformer for converting hydrocarbon fuel into a fuel mixture consisting predominantly of hydrogen and carbon monoxide;

(b) a high temperature fuel cell having an air duct with an inlet and outlet and fuel supply channel also having an inlet and outlet;

(c) a combustion chamber having a fuel inlet, an air inlet and an outlet;

(d) a volume expansion engine having an inlet for the working medium;

wherein the reformer outlet is coupled to the inlet of the fuel supply channel of the high temperature fuel cell, the outlet of the fuel supply channel of the high temperature fuel cell is coupled to the fuel inlet of the combustion chamber, and the outlet of the air duct of the high temperature fuel cell is coupled to the air inlet of the combustion chamber, and the outlet of said combustion chamber is coupled to the volume expansion engine.

2. The power plant of claim 1, further comprising a heat exchanger for heating the reformer coupled between said combustion chamber and said reformer.

3. The power plant of claim 1, wherein said high temperature fuel cell further comprises a heat exchanger for additional heating of fuel fed to said reformer.

4. The power plant of claim 1, wherein said high temperature fuel cell further comprises a heat exchanger for additional heating of air fed to the high temperature fuel cell.

5. The power plant of claim 1, wherein a heat exchanger system operative with the exhaust outlet of the volume expansion engine, said system for heating water to be used in water supply facilities, or air to be used in the air conditioning system, or air prior to feeding it to a compressor, or air that heats refrigerant for a compression refrigerating plant.

6. The power plant of claim 1, wherein an electric generator is mechanically connected to said volume expansion engine.

7. The power plant of claim 1, wherein a compression refrigerating plant is mechanically connected to said volume expansion engine.

8. The power plant of claim 7, wherein the compression refrigerating plant comprises a compressor, a condenser, a throttling device, and an evaporator placed in series.

9. The power plant of claim 8, wherein the exhaust outlet of said volume expansion engine is coupled to a heat exchanger serving as an evaporator of the compression refrigerating plant either directly or thermally via an additional heat exchanger.

10. The power plant of claim 8, wherein said evaporator of the compression refrigerating plant is in thermal contact with the flows outgoing from the house or industrial building to the sewage collecting system.

11. The power plant of claim 8, wherein the evaporator of the compression refrigerating plant is in thermal contact with the airflow of the ventilation system of the house or industrial building.

12. The power plant of claim 1, wherein the power of said high temperature fuel cell is no greater than 50% of the power of said volume expansion engine.

13. The power plant of claim 1, further comprising an electrical motor/generator and a refrigeration compressor coupled to said volume expansion engine.

14. The power plant of claim 13, further comprising an air compressor coupled to said engine, and said motor/generator, and wherein said engine being operable at powers exceeding the need of said air compressor, whereby said excess engine power is used by said engine to drive said motor/generator, and whereby said fuel cell becomes highly pressurized by said air compressor via said reformer outlet to cause said fuel cell to generate high levels of heat and electricity, and whereby a portion of said high levels of heat is applied to heat exchanger for heating house or building ventilation air or water.

15. The power plant of claim 13, further comprising an air compressor coupled to said engine, and said motor/generator, and wherein said engine being operable at sufficient power to drive said air compressor, said air compressor via reformer highly pressurizes said fuel cell to generate high levels of heat and electricity and means coupling a portion of said electricity to power said motor/generator, and whereby a portion of said motor/generator power is applied to drive said refrigeration compressor.

16. A power plant, for houses or buildings, comprising:

- (a) a reformer for converting hydrocarbon fuel into a fuel mixture comprising hydrogen and carbon monoxide;
- (b) a high temperature fuel cell having an air duct with an inlet and outlet and fuel supply channel also having an inlet and outlet;
- (c) a distributor having one inlet and two outlets;
- (d) a combustion chamber having a fuel inlet, an air inlet and an outlet;

(e) a volume expansion engine having an inlet which supplies the working medium;

wherein the reformer outlet is coupled to the inlet of the fuel supply channel of the high temperature fuel cell, the outlet of the fuel supply channel of the high temperature fuel cell is coupled to the fuel inlet of the combustion chamber via the distributor, and the outlet of the air duct of the high temperature fuel cell is coupled to the air inlet of the combustion chamber, the outlet of the distributor is coupled to the reformer inlet and the outlet of the combustion chamber is coupled to the inlet of the volume expansion engine.

17. The power plant of claim 16, wherein said combustion chamber is coupled to said reformer via a heat exchanger that heats the reformer.

18. The power plant of claim 16, wherein said high temperature fuel cell further comprises a heat exchanger for additional heating of fuel fed to the reformer.

19. The power plant of claim 16, wherein said high temperature fuel cell further comprises a heat exchanger for additional heating of air fed to the high temperature fuel cell.

20. The power plant of claim 16, further comprising a pump operable between the outlet of said reformer and the inlet of the high temperature fuel cell.

21. The power plant of claim 16, further comprising a system of heat exchangers operably coupled to the exhaust outlet of said volume expansion engine for heating water to be used in hot water and water supply systems, or air to be used in the air conditioning system, or air prior to feeding it to a compressor, or air that heats a refrigerant for a compression refrigerating plant.

22. The power plant of claim 16, further comprising an electric generator is mechanically connected to said volume expansion engine.

23. The power plant of claim 13, wherein a compression refrigerating plant is mechanically connected to said volume expansion engine.

24. The power plant of claim 23, wherein said compression refrigerating plant comprises a compressor, a condenser, a throttling device, and an evaporator placed in series.

25. The power plant of claim 24, wherein the exhaust outlet of said volume expansion engine is coupled to an evaporator of said compression refrigerating plant either directly or via a heat exchanger.

26. The power plant of claim 24, wherein the evaporator of said compression refrigerating plant is in thermal contact with the flows from the house or industrial building to the sewage collecting system.

27. The power plant of claim 24, wherein the evaporator of said compression refrigerating plant is in thermal contact with the airflow of the ventilation system of the house or industrial building.

28. The power plant of claim 16, wherein the power of said high temperature fuel cell is no greater than 50% of the power of the volume expansion engine.

29. The power plant of claim 16, further comprising an electrical motor/generator and a refrigeration compressor coupled to said volume expansion engine.

30. The power plant of claim 29, further comprising an air compressor coupled to said engine, and said motor/generator, and wherein said engine being operable at powers exceeding the need of said air compressor, whereby said excess engine power is used by said engine to drive said motor/generator, and whereby said

fuel cell becomes highly pressurized by said air compressor via said reformer outlet to cause said fuel cell to generate high levels of heat and electricity, and whereby a portion of said high levels of heat is applied to heat exchanger for heating house or building ventilation air or water.

31. The power plant of claim 29, further comprising an air compressor coupled to said engine, and said motor/generator, and wherein said engine being operable at sufficient power to drive said air compressor, said air compressor via reformer highly pressurizes said fuel cell to generate high levels of heat and electricity and means coupling a portion of said electricity to power said motor/generator, and whereby a portion of said motor/generator power is applied to drive said refrigeration compressor.

32. The power plant of claim 7, wherein said refrigerating plant includes a refrigerant compressor and an accumulator coupled to the outlet of said refrigerant compressor.

33. The power plant of claim 23, wherein said refrigerating plant includes a refrigerant compressor and an accumulator coupled to the outlet of said refrigerant compressor.

34. The power plant of claim 1, further comprising an air compressor coupled to said engine and an accumulator coupled to the outlet of said air compressor for accumulating and smoothing airflow supplied by said air compressor.

35. The power plant of claim 16, further comprising an air compressor coupled to said engine and an accumulator coupled to the outlet of said air compressor for accumulating and smoothing airflow supplied by said air compressor.